# DIRECT INVESTIGATION

# REPORT ON
# ALLEGED OVERCHARING OF WATER BILLS

**March 2008**

**Office of The Ombudsman**

**Hong Kong**

CONTENTS


*EXECUTIVE SUMMARY*

| *Chapter* | | *Paragraph* |
|---|---|---|
| *1* | *INTRODUCTION* | |
| | *Background* | *1.1 - 1.2* |
| | *Purpose and Ambit* | *1.3* |
| | *Methodology* | *1.4 - 1.5* |
| | *Investigation Report* | *1.6* |
| *2* | *BILLING AND OCCURRENCE OF OVERCHARGING* | |
| | *Customer Care and Billing System* | *2.1* |
| | *Billing Mechanism* | *2.2 - 2.16* |
| | *Causes for Overcharging* | *2.17 - 2.20* |
| *3* | *CASE STUDIES* | |
| | *Established Cases of Overcharging* | *3.1* |
| | *Excessive Charges* | *3.2* |
| | *Sample Cases* | *3.3 - 3.17* |
| *4* | *OBSERVATIONS AND OPINIONS* | *4.1 - 4.5* |
| | *Billing Mechanism* | *4.6 - 4.15* |
| | *Manpower* | *4.16 - 4.18* |
| | *Handling Enquiries and Complaints* | *4.19* |
| *5* | *RECOMMENDATIONS* | *5.1* |
| *6* | *FINAL REMARKS* | |
| | *Comments from Water Supplies Department* | *6.1 - 6.2* |
| | *Final Remarks from The Ombudsman* | *6.3 - 6.4* |

*ANNEXES*

| | |
|---|---|
| *1* | *Calculation of High/Low Boundaries for Meter Reading* |
| 2 | *Trades with High Consumption Monthly Water Accounts* |
| 3 | *Water Tariff* |
| 4 | *General Categorisation of Non-domestic Water Accounts* |
| 5 | *Level 1 Fault Checking by CCBS* |

# EXECUTIVE SUMMARY

## Direct Investigation on Alleged Overcharging of Water Bills

### Background

Complaints against the Water Supplies Department ("WSD") about overcharging have continued to surface over the years. Some water bills involve huge sums and WSD is criticised for not handling complaints satisfactorily.

2. Concerned that this might be indicative of systemic problems in the procedures for issuing bills and handling complaints about water charges, The Ombudsman declared a direct investigation under section 7(1)(a)(ii) of The Ombudsman Ordinance, Cap. 397 to examine:

(a) causes for overcharging;
(b) procedures and practices for handling complaints about excessive water charges;
(c) resolution of such disputes and follow-up action; and
(d) remedial measures.

### Billing Mechanism

3. In full operation since January 2005, the Customer Care and Billing System ("CCBS") is an integrated computer system servicing 2.68 million water accounts. CCBS coordinates all WSD functions relating to customer servicing including billing. The billing process comprises the following steps:

(a) **Consumption Determination.** WSD conducts meter reading in a four-month revolving cycle. Where actual reading is unobtainable due to inaccessible, defective or missing meter, consumption will be estimated. Under some circumstances, new accounts and terminated accounts may also be billed by estimation.

(b) **Charge Calculation.** Domestic accounts are charged according to a four-tier tariff system that links an incremental charge scale to consumption levels to encourage frugal use. Non-domestic accounts are charged a flat rate, but construction and ocean going shipping

customers are subject to higher rates.

(c)(i) **First Level Fault Checking: Consumption Ceiling for Meter Readings.** WSD checks a reading against an acceptable maximum consumption value based on past consumption pattern and trade type (for non-domestic accounts). Staff will intervene usually by conducting special readings for anomalous cases detected.

(c)(ii) **Second Level Fault Checking: Value Ceiling for Water Charges.** WSD checks each water charge calculated based on an accepted reading against a set charge ceiling. Staff will follow up as in c(i).

(d) **Bill Issue**: WSD issues bills over a four-month revolving cycle.

**Cases of Overcharging**

4. From 1 April 2005 to 31 October 2007, WSD received 85,666 complaints about suspected overcharging, 32,945 of which were subsequently confirmed and rectified. These confirmed cases with excessive charges totalling $38.07 million had resulted from the causes set out below.

**Table 1. Causes of Confirmed Cases of Overcharging (1.4.2005 – 31.10.2007)**

| Cause | No. of Cases | Percentage |
|---|---|---|
| Incorrect meter reading | 2,554 | 7.75% |
| Defective meter | 3,037 | 9.22% |
| Inaccurate estimation | 18,218 | 55.30% |
| Wrong meter arrangement[1] | 460 | 1.40% |
| Leakage of inside service | 92 | 0.28% |
| Cannot be ascertained by WSD[2] | 8,584 | 26.05% |
| Total | 32,945 | 100% |

**Sample Cases**

5. We have examined 20 of the cases incurring the biggest amounts of overcharging in

[1] *This normally happens when water users carry out plumbing works without notifying WSD, and inadvertently mix up their own water meter with other meters in the process.*

[2] *Cases where: (a) billing was based on actual meter reads,(b) the meter has been tested to be accurate and (c) there is no sign of leakage. In such cases, adjustment of the bills is a result of negotiation based on acceptable justification from complainants.*

2005/06 and 2006/07. The degree of excessive charging ranges from 18% to 3,697 times of the actual amount. We have summarised four cases for illustration.

| | |
|---|---|
| **Case 1:** | Excessive estimated charge upon termination of non-domestic account. |
| Facts: | The user vacated the premises in April 2005 without notifying WSD. When WSD realised this on 14 July 2005, it terminated the account and estimated the final bill for April to July 2005, charging $146,447.40. The user disputed, providing a photo of the water meter taken on 23 July 2005. WSD revised the charge to $39.60. |
| Observation: | WSD could have handled this case more prudently by first contacting the former user or conducting a special meter reading. The latter could be arranged by WSD within 14 days. The fact that the reading ultimately adopted was taken by the former user nine days after account termination shows that despite WSD's standard requirement for 14-day advance notification, calculating the final bill with a reading taken days after account termination is an acceptable alternative. |
| **Case 2:** | Excessive estimated charge for new non-domestic account. |
| Facts: | The account was opened on 13 October 2005 and the first meter reading was scheduled for early March 2006. WSD issued the first bill on 14 February 2006 by estimation, charging $277,320.50. The user disputed it with photos of the water meters concerned taken on 23 February 2006. WSD revised the charge to $35,008.10. |
| Observation: | WSD had four months to arrange a special meter reading before issuing the bill on 14 February 2006. Alternatively, WSD could have waited until early March 2006 for a reading. Furthermore, WSD could have asked the user to report the reading, given that the reading ultimately adopted was in any case taken by the user. |
| **Case 3:** | Domestic overcharging caused by a combination of human error |

and manpower constraint.

Facts: WSD found the meter defective on 10 May 2005 and replaced it with a new one on 20 May 2005. Subsequently, WSD issued a bill for the period of 10 May 2005 to 6 September 2005. While the actual consumption between 20 May and 6 September 2005 was recorded by the new meter to be 54 cubic metres, the consumption from 10 to 20 May 2005 should have been estimated but instead, through human error, the incorrect reading of 10,933 cubic meters taken at the time of meter replacement was used. Although the bill was temporarily withheld by the first and second level fault checks, it was not followed up according to procedures because of manpower constraint. CCBS hence resumed bill processing and a bill of $117,918.40 was issued. After the user disputed, it was revised to $288.50.

Observation: Manpower constraint rendered the checking mechanism ineffective in this case. This highlights the importance of backing up the mechanism with adequate follow-up manpower.

**Case 4:** Incorrect meter reading for domestic account.

Facts: The meter registered a reading of 3,419 (from 3,401, i.e. consumption of 18 cubic metres). However, the meter reader misread it as 342[3], i.e. 10,342 or consumption of 6,941 cubic metres. Although the reading and, consequently, charge errors were detected by the two fault checks, they were not followed up as required because of manpower constraint. Hence, CCBS reactivated the case and issued a late payment bill for 74,998.70. The user disputed and a revised bill of $466.6 was issued.

Observation: Similar to Case 3, this case illustrates that, notwithstanding the computer mechanism for gate-keeping in CCBS, human back-up remains an essential element the adequacy of which needs to be assured.

[3] *The meter has four digits and a reading "back" to 342 would indicate an actual reading of 10,342.*

**Observations and Opinions**

6. Although the established cases of inaccurate charging represent a minute fraction of over eight million water bills issued each year, they dent WSD's reputation and professional credibility in the eyes of the community. Moreover, the full extent of overcharging is not clear as cases unnoticed by water users will never come to light. The numerous cases that did get detected incurred remedial costs in terms of extra man-hours for processing complaints and rectifying errors, not to mention the anxiety of the affected users and their grievance against Government. These costs may be less visible, but are nonetheless real and not to be underestimated.

7. The classification of these established cases is also a matter for concern. By attributing overcharging to only five causes, WSD's classification appears unduly simplistic and inadequate. **Case 3** is classified as "defective meter", but was in fact caused by a human error in using a reading known to be wrong. **Case 4** is attributed to "incorrect meter reading", but in fact failure by WSD staff to follow up the detected bill promptly was the main cause for the blunder.

8. The established cases are the best tool for WSD to understand the overcharging problem and to work out preventive measures. To ensure effective analysis and remedy, accurate case classification is essential.

9. **Consumption Determination.** Defective meters were responsible for 9.22% of the overcharging cases (see **Table 1**). Meters have an optimum life expectancy of 12 years, but as at April 2006, about 1.2 million meters were over 12 years old and 20-year-old meters are still in use. In this connection, WSD is implementing a programme to replace all meters over 12 years old by March 2011. Some 400,000 water meters have been replaced so far.

10. From April 2005 to October 2007, WSD recorded 2,554 cases of overcharging because of incorrect meter reading (see **Table 1**). With over eight million readings taken a year, this may be regarded as an impressive accuracy of 99.97% overall. That said, incorrect meter reading still accounted for 7.75% of the cases of overcharging (see **Table 1**) and the margin, or magnitude, of error could be outrageous (see **Case 4**).

11. **Charging by Estimation.** Where water charges are over-estimated, the magnitude of the excessive sums is, in some cases, staggering (exceeding the adjusted charge by over $146,000 or 3,697 times in **Case 1** and by over $242,000 or 6.9 times in **Case 2**). In fact, "Inaccurate charge estimation" is the predominant cause for overcharging, responsible for 55.3% of the overcharging cases (see **Table 1**).

12. Estimation in **Cases 1 and 2** was unnecessary and exposed WSD's inclination to do

what is convenient to itself with little regard for users' rights or concern. It seems to us that when a special reading cannot be (or simply is not) arranged, WSD prefers estimating to accepting a user's own reading. The tendency towards expedience must be discouraged and should be abandoned.

13. We accept that WSD priority is to protect public revenue and does need to charge by estimation in some circumstances. Nevertheless, it should do so only on need and with caution and common sense. Where estimation can practicably be replaced with proactive customer services, the latter should take precedence.

14. **Fault Checking.** The fault checking problem in **Cases 3 and 4** shows that technology aside, vigilant monitoring and proactive human back-up are equally essential elements of effective problem detection and prevention. Both seem to have been deficient at WSD.

15. **Manpower Constraint. Cases 3 and 4** highlight the manpower constraint that rendered CCBS's checking mechanism ineffective. They occurred respectively nine and 14 months after CCBS launch. Given WSD's explanation that the manpower constraint arose from an upsurge in workload and teething problems at the initial stage of CCBS operation, its continuation raises legitimate questions about WSD's manpower planning and staff training and orientation for CCBS launch.

16. **Handling Enquiries and Complaints**. WSD's enquiries and complaints service encountered serious problems at the inception of CCBS in early 2005. The situation has improved since mid-2005, but WSD should regularly review and where warranted, upgrade its capacity for providing prompt response to public enquiries and complaints.

**Recommendations**

17. It is to the credit of WSD that the Hong Kong community has consistently enjoyed safe and reliable water supply over the years. However, there is room for improvement in its service delivery. From our findings, The Ombudsman makes the following recommendations to the Director of Water Supplies:

***General***

(1) Promote staff awareness of the problem of inaccurate charging and enhance their vigilance to signs of problems.

(2) Conduct a comparative study on resources incurred for handling overcharging cases *vis-à-vis* those for special readings for more economical and customer-friendly action.

(3) Review established cases of overcharging to identify causes other than those outlined in Table 1 (such as human error and manpower constraint).

(4) Review classification of established cases of overcharging to facilitate effective analysis and consequential management decisions and strategy.

***Billing Mechanism***

<u>Consumption Determination and Charging by Estimation</u>

(5) Remind meter readers regularly of the importance of accurate meter reading and ensure effective monitoring of their performance.

(6) Review the estimation mechanism, in particular with accounts without consumption pattern as basis for estimation, with a view to reducing the scope for excessive, disproportionate estimation.

(7) Conduct actual meter reading, rather than estimating, wherever practicable.

(8) Where practicable, ask users to report meter readings to minimise the need for estimating.

(9) Where appropriate, contact users to better understand their usage pattern and special circumstances during the period (such as the premises being left vacant) to arrive for more accurate estimation.

<u>Fault Checking</u>

(10) Remind staff of the Customer Account Section of the importance of prompt follow-up action on cases detected by the fault checking

procedures.

*Manpower Constraint*

(11) Review manpower required to follow up on cases caught by the fault checking procedures.

*Handling Enquiries and Complaints*

(12) Regularly review and where warranted, upgrade WSD's capacity for providing prompt response to public enquiries and complaint.

(13) Take steps to enhance public awareness of water charge calculation and the channels for enquiries and complaints.

**Comments from WSD**

18. WSD has generally accepted our recommendations and estimates that implementation will take one year.

**Final Remarks**

19. The Ombudsman is grateful to the Director of Water Supplies and his colleagues for cooperation throughout the investigation. In particular, we appreciate the prompt and positive response to our findings.

20. We will monitor progress of implementation of our recommendations.

**Office of The Ombudsman**
**March 2008**

# 1

# INTRODUCTION

## BACKGROUND

**1.1** Over the past three years (from 2004/05 to 2006/07), we have received over 360 complaints against the Water Supplies Department ("WSD"), making it one of the few works departments topping the list. Although cases alleging overcharging of water bills may not be unduly numerous (over 70), these have continued to surface invariably.

**1.2** Some of the bills involve huge sums and WSD is criticised for not handling complaints satisfactorily. Concerned that this may be indicative of systemic problems in the procedures for issuing bills and for handling complaints about water charges, The Ombudsman decided to initiate a direct investigation into this issue under section 7(1)(a)(ii) of The Ombudsman Ordinance, Cap. 397. On 13 March 2007, she informed the Director of Water Supplies ("DWS") of her decision and declared this at a press conference on 22 March 2007.

## PURPOSE AND AMBIT

**1.3** With the aim of helping WSD identify and rectify systemic problems that may lead to overcharging, thereby safeguarding the interests of water users, our investigation covers:

(a) causes for overcharging;

(b) procedures and practices for handling complaints about excessive water charges;

(c) resolution of such disputes and any follow-up action; and

(d) remedial measures.

## METHODOLOGY

**1.4** We examined and analysed WSD statistics, case files and background material. Our investigation team maintained liaison with WSD representatives throughout the investigation.

**1.5** Members of the public were invited to give comments and suggestions between 22 March 2007 and 23 April 2007. We received three submissions.

## INVESTIGATION REPORT

**1.6** A draft investigation report was sent on 18 February 2008 to DWS for

comments. Our investigation team met with WSD representatives on 25 February 2008. DWS's comments were received on 5 March 2008. Where appropriate, we have incorporated those views in our report. This final report was issued on 10 March 2008.

# 2

# BILLING AND OCCURRENCE OF OVERCHARGING

## CUSTOMER CARE AND BILLING SYSTEM

**2.1** Rolled out in December 2004 with full implementation since January 2005, the Customer Care and Billing System ("CCBS") is an integrated computer system incorporating a central database for servicing 2.68 million water accounts, some 2.4 million of which are domestic. The system coordinates all WSD customer service functions for opening new accounts, meter reading, charge calculation, billing, customer contact management, electronic document management, service order management and account termination. It supports the day-to-day operation of WSD's Customer Telephone Enquiry Centre, five Customer Enquiry Centres, five meter reading sub-offices and four regional offices. It also handles billing for and collection of sewage charges and trade effluent surcharges on behalf of the Drainage Services Department.

## BILLING MECHANISM

### Consumption Determination

**2.2** Consumption is recorded by water meters, which have an optimum service life span of 12 years. As at April 2006, about 1.2 million meters were over 12 years old. In some districts, meters up to 20 years old are still in use. However, under a catch-up programme launched in April 2006, meters over 12 years old will all be replaced with new meters by March 2011. Upon the programme's completion, the replacement of 12-year-old meters will become an ongoing operation.

**2.3** Tasked to take routine water meter readings are 69 Meter Reader IIs and 19 contract meter readers, employed on fixed term contracts. Each of them takes about 375 readings on an average eight-hour working day[1]. More experienced are 46 Meter Reader Is, who make random spot checks, take special meter readings and cover turnover and leave arrangements of frontline meter readers. These meter readers report to eight Senior Meter Readers and five Chief Meter Readers.

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[1] *Working hours per week for these meter readers are 45.*

**2.4** Readings are input into a handheld electronic device, or personal digital assistant ("PDA"), loaded with consumption records. If a new reading deviates beyond acceptable "high/low boundaries"[2], the PDA will issue an alert and require the meter reader to double-check. Meter readers are also required to report any water meter irregularities observed by logging a PDA record. After completion of meter reading assignments, a meter reader reports back to the office, connects the PDA to CCBS and keys in password for data transfer.

**2.5** With the exception of some 5,400 high consumption accounts[3] which receive monthly meter reading and water bills, WSD completes one round of meter reading in a four-month revolving cycle. Each meter is assigned a date for reading based on location and manpower once every four months.

**2.6** WSD pledges an accuracy of 99.9% in meter reading. However, if an accurate meter reading is unobtainable – for reasons such as inaccessible, defective or missing meter – WSD will normally bill an account based on estimated consumption as an interim measure to comply with its billing cycle. In 2005/06 and 2006/07, estimated bills accounted for about 3% of the total bills issued. WSD applies the following three-step logic for estimating consumption:

(a) according to the consumption of that customer a year ago

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[2] *These are calculated by CCBS using an estimated average daily consumption it projects for an account, based on past consumption patterns, previous readings, consumption trends of similar industries etc. See **Annex 1** for the detailed calculation methodology.*

[3] *New accounts of a non-domestic nature with a meter size of 40 mm or more, and existing accounts with average daily consumption exceeding 40 cubic metres are eligible to apply for monthly reading and billing as a "high consumption" account. See **Annex 2** for the trade sectors with high consumption accounts.*

provided that that consumption was not estimated and the consumption period was sufficiently long, i.e. at least 25 days;

(b) if (a) is unsuccessful, then according to the consumption of that customer in the preceding period provided that that consumption was not estimated and the consumption period was sufficiently long, i.e. at least 25 days; or

(c) if (b) is still unsuccessful, according to trend data of the category of that customer, based on the following formula -

$$\frac{\textit{Subject account's usage in previous period}}{\textit{Average usage by customers in the same classification in previous period}} \times \textit{Average usage by customers in the same classification in current period}$$

**2.7** Apart from the above situations, new accounts and terminated accounts may also be billed by estimation under some circumstances.

**2.8** With a new account, the first bill is based on estimated consumption when it is assigned a first billing date before its meter is read for the first time. This happens because the two dates are assigned to optimise their respective schedules (i.e. the billing cycle and the meter reading cycle respectively) and do not necessarily coincide. In this event, rather than holding the first bill over until the first reading has been taken, WSD will proceed with billing by estimation.

**2.9** With terminated accounts, WSD requires users to give 14-day advance notice so that a special reading can be arranged before issuing the final bill. For accounts closed at shorter notice, WSD resorts to estimating the final bill.

**2.10** As estimation is bound by logic that embodies pre-set limits on consumption level (see **para. 2.6**), estimated bills should not deviate beyond acceptable boundaries.

**2.11** However, being approximations, estimated readings are almost bound to deviate from actual consumption. When an actual reading is available, any charge discrepancy will be addressed by adjustment in subsequent billing.

**Charge Calculation**

**2.12** Domestic accounts are charged according to a four-tier tariff system that links an incremental charge scale to consumption levels to encourage frugal use. Non-domestic accounts are charged a flat rate with the exception of construction and ocean-going shipping which are subject to higher rates (see **Annex 3**). On applying for a new account or change of consumer, a non-domestic applicant is required to choose a categorisation from WSD's trade list (see **Annex 4**).

**Fault Checking**

**2.13** CCBS has two levels of fault checking before issue of water bills:

(a) **Consumption ceiling for meter readings.** CCBS checks each meter reading against an acceptable maximum consumption value projected on the basis of each account's past consumption pattern, trade type (for non-domestic accounts) and other relevant factors (see **Annex 5**). A meter reading in breach of this ceiling will not be used for billing. Instead, staff from the Customer Account Section will intervene by adding an alert message in the bill, taking a special reading or conducting a site inspection. If confirmed, the reading will be used to calculate the bill which will then be issued without going through the next level of checking, at (b) below. The water bill, however, will carry an alert message about the high consumption and advise the user to look into its cause.

As estimated consumptions are derived from logic with pre-set limits (see **para. 2.10**), they are not subject to this check.

(b) **Value ceiling for water charges.** Data that have passed (a) will be used to calculate water charges. CCBS then checks these money values against set charge ceilings. At present, such threshold values are $3,000 for domestic accounts, $50,000 for regular non-domestic accounts and $500,000 for high-consumption non-domestic accounts. They were set at $20,000, $130,000 and $700,000 respectively at CCBS launch in January 2005, but were revised to the present levels in June 2007 as part of WSD's ongoing review of CCBS. Bills that

breach the threshold values were previously withheld. As a CCBS enhancement, since November 2006, these bills are cancelled and referred to the Customer Account Section for follow-up action as in (a).

**Table 1. No. of Cases Captured by the Two Fault Checking Procedures**

| | 2005/06 | 2006/07 | 2007/08 (as at 31 December 2007) |
|---|---|---|---|
| **Level 1: Consumption ceiling for meter readings** | 460,773 | 456,722 | 324,274 |
| **Level 2: Value ceiling for water charges** | 266 | 1,063 | 5,099 |
| **Total** | **461,039** | **457,785** | **329, 373** |

Source: WSD

**Issuing Bills**

**2.14** Bills that have been cleared through these fault checking procedures are then issued. As with meter reading, each round of water bills for the territory's accounts is generated in bulk over a four-month revolving cycle. WSD adheres to its billing cycle as far as possible for smooth bulk generation of water bills.

**Handling Enquiries and Complaints**

**2.15** Bills issued are presumed accurate. Nevertheless, users who suspect that their bills are inaccurate may complain to WSD. Apart from its Customer Telephone Enquiry Centre (tel. no.: 2824 5000) and Customer Enquiry Centers (see **para. 2.1**), WSD receives enquiries and complaints by post and *via* email <wsdinfo@wsd.gov.hk>.

### Redressing Inaccurate Bills

**2.16** Inaccurate charging is rectified by re-issue of bill or, where payment has been made, adjustment in subsequent billing or refund. For arriving at a revised charge, WSD is guided by Regulation 31 of the Waterworks Regulations, Cap. 102, which sets out the following alternative ways for calculating the consumption for any period where supply is not measured by meter:

(a) according to the average daily rate of consumption obtained between any successive readings before that period; or

(b) at the discretion of the Water Authority (i.e. DWS), according to the average daily rate of consumption between any successive readings following the repair or replacement of a meter that was out of order; or

(c) where it would be inappropriate to calculate the consumption in the manner specified in paragraph (a) or (b), whether by reason of fluctuations in consumption or otherwise, in such manner as may be agreed between the Water Authority and the consumer.

## CAUSES FOR OVERCHARGING

**2.17** Through complaints about overcharging, WSD has identified the following causes for inaccurate charging:

(a) inaccurate estimation

(b) defective meter[4]

(c) incorrect meter reading

(d) wrong meter arrangement[5]

(e) leakage of inside service

**2.18** Manpower constraint had also led to inflated bills. To facilitate prompt follow-up by staff, CCBS was originally programmed to withhold the processing of cases detected at each stage of checking for a prescribed window period during which staff would intervene and verify the cases. If it received no further instructions after the window period, CCBS would re-activate the processing of a withheld case, leading to the issue of a bill or a reminder.

**2.19** However, some problematic bills slipped through because they were not picked up and verified while being temporarily withheld. WSD explains that this was due to an upsurge in workload and teething problems during the initial stage of CCBS launch in January 2005. Since November 2006, instead of being withheld, such cases are cancelled straightaway and referred to staff for separate follow-up action (see **para. 2.13)** to prevent the erroneous issue of over-valued bills.

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[4] *A user who doubts the accuracy of a water meter may request a meter test. This is generally conducted by WSD's Meter Testing Laboratory which has exclusive mastery of the necessary know-how in Hong Kong. If the meter is found to be accurate, the user will have to pay for the testing fee which currently stands at $460 for most meters. The user is invited to witness the test and given test reports.*

[5] *This normally happens when water users carry out plumbing works without notifying WSD, and inadvertently mix up their own water meter with other meters in the process.*

**2.20** We have examined some complaints of overcharging and summarised our findings in the next chapter.

# 3

# CASE STUDIES

## ESTABLISHED CASES OF OVERCHARGING

**3.1** In 2005/06 and 2006/07, WSD received 34,209 and 34,086 complaints[6] respectively of suspected overcharging. It subsequently confirmed that 15,293 and 13,579 of these cases had been inaccurately charged and cancelled the bills concerned. In the seven months ending 31 October 2007, WSD received 17,371 such complaints, resulting in 4,073 bills eventually being cancelled. **Table 2** sets out the distribution of cases with bills subsequently cancelled against the reasons identified in the preceding chapter.

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[6] *Where a complaint is lodged through different channels, overlapping records will occur as CCBS treats each customer contact as a single complaint.*

## Table 2. Causes of Confirmed Cases of Overcharging

| | 2005/06 No. of cases | | | |
|---|---|---|---|---|
| | Non-Domestic (A) | Domestic (B) | (A) + (B) | Percentage of (A + B) of (C) |
| Incorrect meter reading | 246 | 1,171 | 1,417 | 9.27% |
| Defective meter | 447 | 758 | 1,205 | 7.88% |
| Inaccurate estimation | 1,576 | 6,692 | 8,268 | 54.06% |
| Wrong meter arrangement | 21 | 169 | 190 | 1.24% |
| Leakage of inside service | 14 | 19 | 33 | 0.22% |
| Sub-total: | 2,304 | 8,809 | 11,113 | 72.67% |
| Cannot be ascertained by WSD* | 816 | 3,364 | 4,180 | 27.33% |
| Total: | 3,120 | 12,173 | 15,293 | 100% |
| Grand Total (C): | 15,293 | | | |

| | 2006/07 No. of cases | | | |
|---|---|---|---|---|
| | Non-Domestic (A) | Domestic (B) | (A) + (B) | Percentage of (A + B) of (C) |
| Incorrect meter reading | 216 | 591 | 807 | 5.94% |
| Defective meter | 570 | 1,017 | 1,587 | 11.69% |
| Inaccurate estimation | 1,399 | 6,595 | 7,994 | 58.87% |
| Wrong meter arrangement | 23 | 174 | 197 | 1.45% |
| Leakage of inside service | 8 | 23 | 31 | 0.23% |
| Sub-total: | 2,216 | 8,400 | 10,616 | 78.18% |
| Cannot be ascertained by WSD* | 752 | 2,211 | 2,963 | 21.82% |
| Total: | 2,968 | 10,611 | 13,579 | 100% |
| Grand Total (C): | 13,579 | | | |

| | 1.4.2007 – 31.10.2007 No. of cases | | | |
|---|---|---|---|---|
| | Non-Domestic (A) | Domestic (B) | (A) + (B) | Percentage of (A + B) of (C) |
| Incorrect meter reading | 85 | 245 | 330 | 8.10% |
| Defective meter | 92 | 153 | 245 | 6.02% |
| Inaccurate estimation | 305 | 1,651 | 1,956 | 48.02% |
| Wrong meter arrangement | 8 | 65 | 73 | 1.79% |
| Leakage of inside service | 6 | 22 | 28 | 0.69% |
| Sub-total: | 496 | 2,136 | 2,632 | 64.62% |
| Cannot be ascertained by WSD* | 353 | 1,088 | 1,441 | 35.38% |
| Total: | 849 | 3,224 | 4,073 | 100% |
| Grand Total (C): | 4,073 | | | |

Overall distribution for the period studied (1 April 2005 to 31 October 2007):

| | 1.4.2005 -31.10.2007<br>No. of cases | | | |
|---|---|---|---|---|
| | **Non-Domestic (A)** | **Domestic (B)** | **(A) + (B)** | **Percentage of (A + B) of (C)** |
| **Incorrect meter reading** | 547 | 2,007 | 2,554 | 7.75% |
| **Defective meter** | 1,109 | 1,928 | 3,037 | 9.22% |
| **Inaccurate estimation** | 3,280 | 14,938 | 18,218 | 55.30% |
| **Wrong meter arrangement** | 52 | 408 | 460 | 1.40% |
| **Leakage of inside service** | 28 | 64 | 92 | 0.28% |
| **Sub-total:** | 5,016 | 19,345 | 24,361 | 73.95% |
| **Cannot be ascertained by WSD*** | 1,921 | 6,663 | 8,584 | 26.05% |
| **Total:** | 6,937 | 26,008 | 32,945 | 100% |
| **Grand Total (C):** | | | **32,945** | |

Source: WSD

** Cases where: (a) billing was based on actual meter reads,(b) the meter has been tested to be accurate and (c) there is no sign of leakage. In such cases, adjustment of the bills is a result of negotiation based on acceptable justification from complainants.*

## EXCESSIVE CHARGES

**3.2** The excessive charges (i.e. inflated charges minus actual payable charges) incurred in these cases amounted to $16.04 million in 2005/06, $16.22 million in 2006/07 and $5.81 million in the seven months ending 31 October 2007. The average values of the excessive charge per case are $1,048 in 2005/06, $1,194 in 2006/07 and $1,426 between April and October 2007.

## SAMPLE CASES

**3.3** **Table 3** lists 20 complaints, comprising five domestic and five non-domestic cases involving the biggest amounts of overcharging in each of the financial years of 2005/06 and 2006/07. The degree of excessive charging ranges from 18% to 3,697 times of the actual amount.

## Table 3. Overcharging on Water Supply

### Top Five Cases by Value of Excessive Charge

**Domestic Cases in 2005/06**

| | Reason for water bill adjustment | Original amount charged ($) | Amount charged after adjustment (A) ($) | Difference (B) ($) | Range of excessive charging ((B)÷(A)) |
|---|---|---|---|---|---|
| 1 | Defective meter | 123,866.39 | 529.48 | 123,336.91 | 232.9 times |
| 2 | Defective meter | 112,303.30 | 288.50 | 112,014.82 | 388.2 times |
| 3 | Defective meter | 99,224.55 | 0.00 | 99,224.55 | - |
| 4 | Defective meter | 70,243.49 | 149.50 | 70,093.99 | 468.8 times |
| 5 | Defective meter | 54,369.42 | 240.28 | 54,129.14 | 225.2 times |

**Non-Domestic Cases in 2005/06**

| | Reason for water bill adjustment | Original amount charged ($) | Amount charged after adjustment (A) ($) | Difference (B) ($) | Range of excessive charging ((B)÷(A)) |
|---|---|---|---|---|---|
| 1 | Inaccurate charge estimation | 277,320.50 | 35,008.10 | 242,312.17 | 6.9 times |
| 2 | Inaccurate charge estimation | 295,571.86 | 79,087.74 | 216,484.12 | 2.7 times |
| 3 | Inaccurate charge estimation | 146,447.40 | 39.60 | 146,407.80 | 3,697.1 times |
| 4 | Inaccurate charge estimation | 146,252.70 | 277.29 | 145,975.41 | 526.4 times |
| 5 | Inaccurate charge estimation | 165,151.90 | 52,985.26 | 112,166.64 | 2.1 times |

**Domestic Cases in 2006/07**

| | Reason for water bill adjustment | Original amount charged ($) | Amount charged after adjustment (A) ($) | Difference (B) ($) | Range of excessive charging ((B)÷(A)) |
|---|---|---|---|---|---|
| 1 | Incorrect meter reading | 105,302.45 | 2,802.48 | 102,499.97 | 36.5 times |
| 2 | Incorrect meter reading | 71,427.30 | 466.60 | 70,960.75 | 152.1 times |
| 3 | Defective meter | 69,965.32 | 235.21 | 69,730.11 | 296.4 times |
| 4 | Incorrect self-reading | 64,592.01 | 47.76 | 64,544.25 | 1,351.4 times |
| 5 | Defective meter | 61,674.34 | 514.44 | 61,159.90 | 118.8 times |

**Non-Domestic Cases in 2006/07**

| | Reason for water bill adjustment | Original amount charged ($) | Amount charged after adjustment (A) ($) | Difference (B) ($) | Range of excessive charging ((B)÷(A)) |
|---|---|---|---|---|---|
| 1 | Defective meter | 3,467,046.26 | 2,935,303.68 | 531,742.58 | 18% |
| 2 | Incorrect meter reading | 345,570.70 | 12,978.42 | 332,592.28 | 25.6 times |
| 3 | Incorrect meter reading | 225,633.70 | 24,507.58 | 201,126.12 | 8.2 times |
| 4 | Incorrect meter reading | 213,578.90 | 20,057.18 | 193,521.72 | 9.6 times |
| 5 | Inaccurate charge estimation | 203,791.24 | 52,181.84 | 151,609.40 | 2.9 times |

Source: WSD

3.4 For better understanding of overcharging, we have examined these cases and summarise, below, four for illustration.

**Case 1 (2005/06 Non-domestic Case #3 of Table 3)**

3.5 The new owner of the subject premises notified WSD on 14 July 2005 that the former garment cleansing user was no longer in business. WSD terminated the account and billed it for the period from end of April to mid-July by estimation (see **para. 2.9**). The bill was sent on the same day to the former user through a registered postal address. The estimated charge, with the addition of sewage charge and trade effluent surcharges, was $146,447.40.

3.6 On 25 July 2005, the former user wrote to dispute the estimated charge, saying that the premises had been left vacant since April 2005. A photo of the water meter, taken on 23 July 2005, was provided. According to the reading, the actual charge payable was $39.60.

3.7 WSD cancelled the estimated charge and issued a revised bill for $39.60 on 29 July 2005.

Our observation: WSD could have handled this case more prudently by first contacting the former user or arranging a special meter reading at the earliest practicable date, which in any event can be done within 14 days under existing standard practice (see **para. 2.9**). The fact that the reading ultimately adopted was taken by the former user nine days after account termination shows that despite the 14-day advance notification requirement, using a reading taken days after account

termination is an acceptable alternative. It should be more positively adopted in the place of estimation.

**Case 2 (2005/06 Non-domestic Case #1 of Table 3)**

**3.8** This non-domestic account, installed with five water meters, was opened on 13 October 2005. According to the billing cycle, the first water bills were to be issued on 14 February 2006, ahead of the first meter reading which was scheduled to take place between 3 March and 9 March 2006. WSD resorted to estimating the water charge based on the account's trade type, charging a total of $277,320.50 for the five meters (see **paras 2.6 and 2.8**).

**3.9** The user disputed on 23 February 2006, providing photos of the water meters on the premises. According to the readings, the actual amount payable totalled $35,008.10.

**3.10** WSD cancelled the inflated bill and issued a revised bill on 6 March 2006.

Our observation: WSD had four months to arrange a special meter reading before issuing the bill on 14 February 2006. Alternatively, WSD could have waited for a meter reading according to the normal reading cycle, and billed the user at the earliest practicable time in the next billing cycle which, according to WSD, would be 14-15 March 2006. Furthermore, WSD could have asked the user to report the reading, given that the reading ultimately adopted was taken by the user in any case. However, WSD chose estimation, an approach more prone to erroneous charging

(with undercharging also possible causing loss of revenue) and then overcharged the user by almost eight times the actual amount.

**Case 3 (2005/06 Domestic Case #2 of Table 3)**

**3.11** This domestic account had been charged $278.6 by estimation for the period from 31 December 2004 to 10 May 2005. On 11 May 2005, its water meter was found to be faulty at a routine meter reading. The meter was replaced on 20 May 2005.

**3.12** WSD read the meter on 6 September 2005 and issued a bill for the period of 10 May 2005 to 6 September 2005. For charge calculation, the actual consumption of 54 cubic metres recorded by the new meter for 20 May to 6 September 2005 was used. For the preceding ten days affected by the defective old meter, the consumption should have been estimated but instead, through human error, the incorrect reading of 10,933 cubic metres taken at the time of meter replacement was used.

**3.13** Although the inflated consumption record and bill charge, at $112,303.30, were intercepted by the first and second level fault checks respectively (see **para. 2.13**), there was inadequate manpower to follow up the case at each stage (see **paras. 2.18-2.19**). Consequently, a late payment bill including penalty for $117,918.40 was issued.

**3.14** The user disputed on 10 October 2005. WSD cancelled the inflated bill and revised the charge to $288.50.

Our observation: Manpower constraint rendered the checking mechanism ineffective in this case. This highlights the importance of backing up the mechanism with adequate follow-up manpower. The change to the procedures in November 2006 (see **para. 2.19**) has only removed the time pressure for handling the suspect cases identified by the two checks; it has not relieved the manpower requirement. In fact, with the further move in June 2007 to tighten the charge ceilings for the second stage check (see **para. 2.13(b)**), the demand for follow-up manpower has increased (see **Table 1**).

**Case 4 (2006/07 Domestic Case #2 of Table 3)**

**3.15** For this domestic account, the meter reading on 17 January 2006 was 3,401. When it was replaced on 16 February 2006 because the meter lid was missing, the correct reading should be 3,419, i.e. consumption of 18 cubic metres, but it was misread as 342[7], i.e. 10,342 or consumption of 6,941 cubic metres. This led to an inflated water charge of $71,427.30.

**3.16** The reading and charge errors were detected by the two checks respectively but not followed up in time by staff because of manpower constraint. The billing was consequently completed, with the issue of a late payment bill for 74,998.70.

**3.17** The user disputed and a revised bill of $466.6 was issued.

[7] *The meter has four digits and a reading "back" to 342 would indicate an actual reading of 10,342.*

Our observation: Similar to Case 3, this case illustrates that, notwithstanding the computer mechanism for gate-keeping in CCBS, human back-up remains an essential element the adequacy of which needs to be assured.

# 4

# OBSERVATIONS AND OPINIONS

**4.1** Overcharging impinges on consumer rights and reflects badly on the service provider. Public services, in particular, face high expectations for prudent and equitable charging.

**4.2** We appreciate that the established cases of overcharging are but a minute fraction of over eight million water bills issued each year. Yet, to the consumers, even one blunder is still one too many. The extent of overcharging can be outrageous in some cases (see **para. 3.3** and **Table 3**) and even the average excessive charges (see **para. 3.2**) are over 10 times what average households are paying[8]. The blatancy of cases such as those in **Table 3** unavoidably raises doubts about the water billing system and WSD's vigilance in monitoring problems and preventing errors, hence denting its reputation and professional credibility in the eyes of the community.

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[8] *46% of local homes are paying less than $25 per month.*

**4.3** Moreover, the Department's statistics may not reveal the full extent of overcharging, as cases can pass unnoticed by water users and never come to light. The numerous cases that did get detected incurred remedial costs in terms of extra man-hours for processing complaints and rectifying errors, not to mention the anxiety of the affected users and their grievance against Government. These costs may be less visible, but are nonetheless real and not to be underestimated.

**4.4** The classification of these established cases is also a matter for concern. By attributing overcharging to only five causes, WSD's classification appears unduly simplistic and inadequate. **Case 3** is classified as "defective meter", but in fact it was caused by a human error in using a reading known to be wrong. **Case 4** is attributed to "incorrect meter reading", but in fact failure by WSD staff to follow up the detected bill promptly was the main cause for the blunder.

**4.5** The established cases are the best tool for WSD to understand the overcharging problem and to work out preventive measures. To ensure effective analysis and remedy, accurate case classification is essential. In the absence of better options, its current classification has formed part of the basis of our observations.

## BILLING MECHANISM

### Consumption Determination

*Defective Meter*

**4.6** Defective meters contributed to 3,037 cases, or 9.22%, of inaccurate charging in the period studied (April 2005 to October 2007, see **Table 2**). In this connection, we note that WSD's meter replacement programme is in progress and that so far some 400,000 water meters have been replaced (see **para. 2.2**).

*Incorrect Meter Reading*

**4.7** From April 2005 to October 2007, WSD recorded 2,554 cases of overcharging because of incorrect meter reading (see **Table 2**). With over eight million readings taken a year, this may be regarded as an impressive accuracy of 99.97% overall. That said, incorrect meter reading still accounted for 7.75% of the cases of overcharging (see **Table 2**), and the margin, or magnitude, of errors can be staggering (see **Case 4**). In any event, the figure may not represent the full situation (see **para. 4.3**).

**Charging by Estimation**

**4.8** Where water charges are over-estimated, the magnitude of the excessive sums is, in some cases, staggering (exceeding the adjusted charge by over $146,000 or 3,697 times in **Case 1** and by over $242,000 or 6.9 times in **Case 2**).

**4.9** In fact, "inaccurate charge estimation" is by far the predominant cause for overcharging. With 18,218 cases recorded between April 2005 and October 2007, they accounted for 55.3% of the period's total reported cases.

**4.10** Estimation in **Case 1** was totally unnecessary and exposed WSD's inclination to do what is convenient to itself with little regard for users' rights or concern. In this case, the water meter was intact and the former user, though a layman, was able to photograph the reading. WSD staff could have arranged but did not arrange a special reading or even contact the former user for a self-reading. Had it done so, it would have at least been informed that the premises had been vacant for months. It seems to us that when a special reading cannot be (or simply is not) arranged, WSD prefers estimating to accepting a user's own reading. The tendency towards expedience must be discouraged and should be abandoned.

**4.11** In **Case 2**, estimation was again unnecessary. WSD could have arranged a special reading within the four months preceding the first bill to comply with its billing schedule or waited until the meter had been read before issuing the first bill. It could also have contacted the user to work out a practicable arrangement. As in **Case 1**, WSD did what it considered most convenient to its operation, thus forgoing the opportunity for more accurate charging based on an actual meter reading.

**4.12** We accept that WSD priority is to protect public revenue and does need to charge by estimation in some circumstances. Nevertheless, it should do so only on need and with caution and common sense. Where estimation can practicably be replaced with proactive customer services, the latter should take precedence.

**4.13** In this connection, WSD usually takes special readings in cases detected by the fault checking procedures (see **para. 2.13**), which amounted to over

450,000 cases in 2005/06 and again in 2006/07, then to over 320,000 between April and December 2007 (see **Table 1**). In comparison, it issued 239,735 and 232,245 bills on estimation in 2005/06 and 2006/07. Among them are **Cases 1 and 2** and others where estimation was replaceable by more consumer-friendly options. As WSD already conducts large numbers of special readings annually for cases screened out during fault checking, it may as well do so more fully and positively and not rely on estimation. This safeguards consumers' interests, saves WSD resources in having to deal with challenges and complaints and maintains a good corporate image for water supplies services.

**Fault Checking**

**4.14** Water users have legitimate expectations for water bills to be duly screened for errors prior to issue. The fault checking problem in **Cases 3 and 4** shows that technology aside, vigilant monitoring and proactive human back-up are equally essential elements of effective problem detection and prevention. Both seem to have been deficient at WSD.

**4.15** It was after many complaints about overcharging and almost two years after CCBS operation that WSD revised the checking procedures which had allowed over-valued bills to slip through (see **para. 2.19**). Although the tightening of the fault-checking charge ceilings in June 2007 (see **para 2.13(b)**) helps sharpen the alarm system against errors, it has also increased pressure on manpower.

## MANPOWER CONSTRAINT

**4.16** **Cases 3 and 4** highlight the manpower constraint that rendered CCBS checking mechanism ineffective. They occurred respectively nine and 14 months after CCBS launch. Given WSD's explanation that the manpower constraint arose from an upsurge in workload and teething problems at the initial stage of CCBS operation (see **para. 2.19**), its continuation raises legitimate questions about WSD's manpower planning and staff training and orientation for CCBS launch.

**4.17** Besides, we note alarming signs of a continuing manpower planning problem impairing WSD services. In the course of complaint handling, we learned from WSD that its account opening and termination service unit set up in February 2007 as part of its customer service became overloaded within a few months with case backlog.

**4.18** In this connection, WSD should review and simplify procedures to make for flexible manpower deployment. In particular, the second fault checking procedure is demanding more follow-up manpower since adjustment of the charge ceilings (see **Table 1**).

## HANDLING ENQUIRIES AND COMPLAINTS

**4.19** WSD's enquiries and complaints service encountered serious problems at the inception of CCBS in early 2005. In some of the complaints received by this Office, callers were made to wait for almost one hour. Consequently, WSD had to

deploy staff from other sections to help man its hotline, thereby creating backlog in those sections. The situation has improved since mid-2005, but WSD should regularly review and where warranted, upgrade its capacity for providing prompt response to public enquiries and complaints.

# 5

# RECOMMENDATIONS

**5.1** Water supply is vital to the community. WSD has a public duty to ensure water safety and efficient services as well as to safeguard revenue. It is to the credit of WSD that the Hong Kong community has consistently enjoyed safe and reliable water supply over the years. However, there is room for improvement in its service delivery. From our findings, The Ombudsman makes the following recommendations to DWS:

**General**

(1) Promote staff awareness of the problem of inaccurate charging and enhance their vigilance to signs of problems: para. 4.2.

(2) Conduct a comparative study on resources incurred for handling overcharging cases *vis-à-vis* those for special reading for more economical and customer-friendly action: paras. 4.3 and 4.13.

(3) Review established cases of overcharging to identify causes other than those outlined in para. 2.17 (such as human error and

manpower constraint): paras. 4.4-4.5 and 4.16-4.18.

(4) Review classification of established cases of overcharging to facilitate effective analysis and consequential management decisions and strategy: paras. 4.4-4.5.

**Billing Mechanism**

***Consumption Determination and Charging by Estimation***

(5) Remind meter readers regularly of the importance of accurate meter reading and ensure effective monitoring of their performance: para. 4.7.

(6) Review the estimation mechanism, in particular with accounts without consumption pattern as basis for estimation, with a view to reducing the scope for excessive, disproportionate estimation: paras. 4.8 and 4.12.

(7) Conduct actual meter reading, rather than estimating, wherever practicable: paras. 4.10-4.11.

(8) Where practicable, ask users to report meter readings to minimise the need for estimating: paras. 4.10-4.11.

(9) Where appropriate, contact users to better understand their usage pattern and special circumstances during the period (such as the premises being left vacant) to arrive for more accurate estimation: paras. 4.10-4.11 and 4.13.

*Fault Checking*

(10) Remind staff of the Customer Account Section of the importance of prompt follow-up action on cases detected by the fault checking procedures: para. 4.14.

*Manpower Constraint*

(11) Review manpower required to follow up on cases caught by the fault checking procedures: para. 4.18.

*Handling Enquiries and Complaints*

(12) Regularly review and where warranted, upgrade WSD's capacity for providing prompt response to public enquiries and complaints: para. 4.19.

(13) Take steps to enhance public awareness of water charge calculation and the channels for enquiries and complaints: para. 4.19.

# 6

# *FINAL REMARKS*

## COMMENTS FROM WSD

**6.1** We have studied DWS's comments on our draft investigation report and where appropriate, incorporated them into the text.

**6.2** WSD has generally accepted our recommendations and estimates that implementation will take one year.

## FINAL REMARKS FROM THE OMBUDSMAN

**6.3** The Ombudsman is grateful to DWS and his colleagues for cooperation throughout the investigation. In particular, we appreciate the prompt and positive response to our findings.

**6.4** We will monitor progress of implementation of our recommendations.

**Office of The Ombudsman**

**Ref. OMB/DI/165**

**March 2008**

# ANNEXES

**Annex 1**
**(para. 2.4)**

## Calculation of High / Low Boundaries for Meter Reading

For each meter reading to be taken, CCBS

1) projects an estimated consumption value based on factors such as past consumption patterns, previous readings, consumption trends of similar industries (in the case of non-domestic accounts) etc.

2) uses the estimated consumption to calculate a high limit and a low limit for the reading to be taken, based on specific graded high / low factors determined by the average daily consumption of the account concerned as shown below:

| Average Daily Consumption (ADC) (cubic metre(s) per day) | Low Factor | High Factor |
|---|---|---|
| 0<=ADC<0.2 | 0.01 | 4 |
| 0.2<=ADC<0.5 | 0.33 | 2.5 |
| 0.5<=ADC<0.8 | 0.5 | 2 |
| 0.8<=ADC<2.3 | 0.6 | 2 |
| 2.3<=ADC<40 | 0.65 | 1.8 |
| ADC>=40 | 0.7 | 1.3 |

3) The high / low boundaries are then set by the following formulas:

***High Boundary:*** high limit + (high limit – low limit) x 0.3
***Low Boundary:*** low limit – (high limit – low limit) x 0.3

4) For example, if the last reading taken on 2.1.2007 was 1,120.488, and the estimated ADC is 0.38 cubic metre which falls within the band "0.2<=ADC<0.5",the high / low limits for the next four monthly meter read taken on 2.5.2007 would be calculated as follows:

***High limit:*** 1120.488 + (0.38 x 2.5 x 120) = 1234.488
***Low limit:*** 1120.488 + (0.38 x 0.33 x 120) = 1135.536

5) The high / low boundaries are then derived as follows:

***High boundary:*** 1234.488 + (1234.488 – 1135.536) x 0.3 = 1246.173
***Low boundary:*** 1135.536 – (1234.488 – 1135.536) x 0.3 = 1105.850

6) The high / low boundaries are then input into the meter readers' PDAs, which will issue a warning if an input during meter reading is smaller than the low boundary or greater than the high boundary.

Annex 2
(para.2.5)

## Trades with High Consumption Monthly Water Accounts

Private Fountains
Private Pools & Ponds
Cleansing & Dust Suppression
Gardens, Lawns & Tennis Courts
Washing Vehicles (Private)
Air-conditioning (Private)
Mining
Slaughter Prep. Preserve Meat
Dairy Products
Can Preserve Fruit & Vegetable
Can Preserve Process Seafood
Grain Mill Products
Bakery Product
Vermicelli Noodles Farinaceous
Ice Manufacture (Excl Dry Ice)
Soy & Other Sauces
Other Food Products
Distill Rectify Blend Spirits
Breweries Malt Liquors
Soft Drinks & Carbonated Water
Wearing Apparel
Glove, Headgear, Wearing Apparel
Tanneries & Leather Finishing
Spinning Cotton
Texturizing, Spinning, Weaving
Knit Outwear
Textile Stencil & Print
Bleaching & Dye of Yarn
Bleaching & Dye of Woven Fabric
Bleaching & Dye of Knit. Fabric
Bleaching & Dye of Garments
Washing New Garments
Yarn Sizing
Textile Finishing and Packing
Other Textiles
Paper Products
Printing & Publishing
Basic Industrial Chemicals
Paints, Varnishes and Lacquer
Medicines
Products of Petroleum & Coal
Rubber Products
Plastic Products
Other Chemical Products
Cement
Concrete Mixing
Non-Metallic Mineral Products
Basic Metal Industries
Buff Polish & Electroplate
Other Fabricated Metal Product
Office & Computer Machinery
Radio, TV, Communication Equip.
Electronic Parts & Components
Electrical Workshop
Machinery & Equipments
Large Scale Heavy Industries
Manufacture of Motor Vehicle
Prof. & Sci. Eqp., Photo, Optical
Manufacturing Industries
Utilities, Transport, Travel
Construction, Decoration & Repair
Wholesale
Retail Shop of Any Kind
Restaurants-Chinese
Restaurants-Non-Chinese
Restaurants-Fast Food Shops
Restaurants-Other Eating Place
Hotels
Boarding House
Storage-Cold Store & Container Yard
Commercial Offices
Academic & Sports Institution

Private Welfare Activities
Clubs, Institution & Religious
Hospitals & Clinics
Laundries
Barber & Beauty Shops
Bath Houses & Massage Parlours
Transition
Miscellaneous Services

**Annex 3**
**(para. 2.12)**

# Water Tariff

***Domestic Supplies***

Domestic consumers are usually billed for their water charges at 4-monthly intervals according to the meter readings taken.

The charges payable are calculated on a tariff structure which consists of 4 tiers with progressively increasing prices. The tariff is so constructed to discourage excessive and unnecessary use of water.

The following tariff structure is applicable to water consumed in billing periods since 16 February 1995:

- the first tier of 12 cubic metres is free of charge;
- the second tier of 31 cubic metres is charged at $4.16 per cubic metre;
- the third tier of 19 cubic metres is charged at $6.45 per cubic metre; and
- the fourth tier for any consumption above the level of 62 cubic metres is charged at $9.05 per cubic metre.

To demonstrate how the water charge is calculated, here is a simple example. A consumer consumed 100 cubic metres of water in a 4-month period. The water charge would be calculated by multiplying the consumption volume by the per unit water charge. That is, by multiplying 31 cubic metres by $4.16 plus 19 cubic metres by $6.45 plus 38 cubic metres by $9.05. The consumer is therefore required to pay a water charge of $595.41.

For the purpose of calculating water charges, a 4 month period is defined as 121.64 days in the Waterworks Regulations.

Since water meters will not be read at intervals of exactly 121.64 days, the volume covered by each tier is adjusted on a pro-rata basis according to the actual number of days in the period between two meter readings. As such, a consumer who uses the same amount of water as another one but over a longer period of time will receive a lower water bill.

*Non-domestic Supplies*

Non domestic consumers are usually billed for their water charges at 4-monthly intervals according to the meter readings taken. For consumers having large water consumption, they are billed at monthly intervals.

The charges payable are calculated at a flat rate dependent on the purpose of the supply.

The following rates are applicable to water consumed in billing periods since 1 July 1996:

| | |
|---|---|
| For trade | $4.58 per cubic metre |
| For construction | $7.11 per cubic metre |
| For non ocean-going shipping | $4.58 per cubic metre |
| For ocean-going shipping | $10.93 per cubic metre |

To demonstrate how the water charge is calculated, here is a simple example. A trading firm consumed 100 cubic metres of water in a 4-month period. Its water charge would be calculated by multiplying the consumption volume by the per unit water charge. That is, by multiplying 100 cubic metres by $4.58 per cubic metre. The trading firm is therefore required to pay a water charge of $458.

# General Categorisation of Non-domestice Water Accounts

| 商業種類編碼<br>Business Classification Code | 說明<br>Description | |
|---|---|---|
| 金屬礦物開採業 | | Metal Ore Mining |
| 211998 | 金屬礦物開採 | metal ore mining |
| 219998 | 未有於別處分類的礦物開採 | mining, n.e.c. |
| 食品加工業 | | Food Manufacturing |
| 311100 | 屠宰、調製及醃製肉類 | slaughtering, preparing & preserving meat |
| 311198 | 動物製品的加工，包括獸皮商、骨類加工、脂肪、血、豬油、毛和皮 | processing of animal products, incl. fellmongery, processing of bones, fats, bloods, lard, hairs, feathers |
| 311200 | 乳類製品 | dairy products |
| 311300 | 水果和蔬菜的裝罐和醃製 | canning & preserving of fruit & vegetables |
| 311400 | 魚類和介殼類的裝罐、醃製和加工 | canning, preserving and processing of fish & crustaceans |
| 311500 | 菜油、花生油、薄荷油及大茴香子油 | vegetable oil, peanut oil, peppermint oil, and aniseed oil |
| 311600 | 穀物碾磨製品 | grain mill products |
| 311700 | 麵包製品 | bakery products |
| 311800 | 粉麵和類似的米粉或麵粉製品 | vermicelli, noodles & similar farinaceous products |
| 312200 | 可可、巧克力和糖果 | cocoa, chocolate and sugar confectionery |
| 312905 | 製冰（不包括乾冰） | ice manufacture (excl dry ice) |
| 312913 | 醬油和其他調味料 | soy & other sauces |
| 312998 | 未有於別處分類的其他食品，包括罐頭食品 | other food products, inc canned food n.e.c. |
| 飲料工業 | | Beverage Industries |
| 313100 | 蒸餾，精餾及混合酒精 | distilling, rectifying & blending spirits |
| 313200 | 啤酒及麥芽酒釀造 | breweries & manufacture of malt liquors |
| 313300 | 汽水及碳酸化飲品工業 | soft drinks & carbonated water industries |
| 煙草加工業 | | Tobacco Manufacturing |
| 314000 | 煙草加工 | tobacco manufacturing |
| 製衣業，不包括鞋類 | | Manufacture of Wearing Apparel except footwear |
| 320998 | 不包括針織外衣的穿戴服飾 | wearing apparel other than knit outerwear |
| 322998 | 手套、帽、未有於別處分類的服裝（包括皮帶和領帶）、餐巾、刺繡品和手錶帶（非金屬）、以及傢俬布用品 | gloves, headgear, wearing apparel (inc belts & neckwear) n.e.c., napkins, embroidery, and wristwatch bands (other than metal), and upholstery |
| 皮革和皮革製品業不包括鞋履和穿戴服飾 | | Manufacture of Leather & Leather Products, except footwear & wearing apparel |
| 323100 | 鞣製及皮革製品整理 | tanneries & leather finishing |
| 323998 | 皮革和仿皮革製品（不包括鞋類和衣服），以及女用手提包（不包括藤、草和塑膠袋） | products of leather and leather substitutes (excl footwear & clothing), and handbags (excl rattan, straw and plastic bags) |
| 製鞋業，不包括橡膠，塑膠和木製鞋 | | Manufacture of Footwear, except rubber, plastic & wooden footwear |
| 324000 | 製鞋，不包括橡膠、塑膠和木製鞋 | footwear, except rubber, plastic & wooden footwear |

n.e.c. = not elsewhere classified

| 商業種類編碼<br>Business Classification Code | | 説明<br>Description |
|---|---|---|
| 紡織業 | | Manufacture of Textiles |
| 325200 | 棉紡 | spinning cotton |
| 325998 | 膨化處理，紡紗（不包括棉），梭織，針織（不包括外衣），織襪，針織內衣 | texturizing, spinning (excl cotton), weaving, knitting (excl outerwear), hosiery, knit underwear |
| 327600 | 針織外衣 | knit outerwear |
| 328200 | 紡織製網及印花 | textile stencilling & printing |
| 328400 | 紗線漂染 | bleaching & dyeing of yarn |
| 328500 | 梭織布漂染 | bleaching & dyeing of woven fabric |
| 328600 | 針織布漂染 | bleaching & dyeing of knitted fabric |
| 328700 | 成衣漂染 | bleaching & dyeing of garments |
| 328902 | 新成衣清洗（不包括洗衣業務） | washing new garments, excluding laundries |
| 328904 | 紗上漿 | yarn sizing |
| 328998 | 紡織品的整理和包裝，抓毛 | textile finishing and packing, napping |
| 329998 | 其他紡織品，不包括傢俬布 | other textiles, excl upholstery |
| 木和軟木製品業不包括傢具 | | Manufacture of Wood & Cork Products except furniture |
| 331000 | 木和軟木製品不包括傢具 | wood & cork products except furniture |
| 傢具和其附屬裝置業，不包括以金屬為主的傢具 | | Manufacture of Furniture & Fixtures, except primarily of metal |
| 332000 | 傢具和其附屬裝置，不包括以金屬為主的傢具 | furniture & fixtures, except primarily of metal |
| 紙及紙製品製造業 | | Manufacture of Paper & Paper Products |
| 341100 | 紙漿、紙張及紙板 | pulp, paper & paperboard |
| 341998 | 紙製品 | paper products |
| 印刷、發行和相關工業製造業 | | Manufacture of Printing, Publishing & Allied Industries |
| 342000 | 印刷、發行和相關工業，書本釘裝、文具、以及賽璐珞 | printing, publishing & allied industries, book binding, stationery, & celluloid. |
| 化學物和化學製品製造業 | | Manufacture of Chemicals & Chemical Products |
| 351100 | 基本工業用化學物 | basic industrial chemicals |
| 352100 | 油漆、罩光漆及塗漆 | paints, varnishes and lacquers |
| 352200 | 藥物 | medicines |
| 352300 | 肥皂和清潔用品、香水、化粧品 | soap & cleaning preparations, perfumes, cosmetics |
| 359998 | 其他化學物和化學製品 | other chemicals & chemical products |
| 石油和煤製品製造業 | | Manufacture of Products of Petroleum & Coal |
| 353998 | 石油和煤製品 | products of petroleum & coal |
| 橡膠製品製造業 | | Manufacture of Rubber Products |
| 355000 | 橡膠製品 | rubber products |
| 塑膠製品製造業 | | Manufacture of Plastic Products |
| 356000 | 塑膠製品 | plastic products |
| 非金屬礦物製品製造業，不包括石油和煤 | | Manufacture of Non-metallic Mineral Products, except products of petroleum & coal |
| 361000 | 陶器、瓷器和土製器皿 | pottery, china & earthenware |

| 商業種類編碼<br>Business Classification Code | 說明<br>Description | |
|---|---|---|
| 362000 | 玻璃和玻璃製品（不包括眼鏡和光學鏡片） | glass & glass products (excl spectacles & optical lenses) |
| 369100 | 結構黏土製品 | structural clay products |
| 369201 | 水泥 | cement |
| 369202 | 混凝土 | concrete mixing |
| 369203 | 石灰 | lime |
| 369204 | 石膏 | plaster |
| 369998 | 未有於別處分類的非金屬礦物製品 | non-metallic mineral products, n.e.c. |
| 基本金屬工業 | | Basic Metal Industries |
| 379998 | 基本金屬工業 | basic metal industries |
| 金屬製品製造業，不包括機械和裝備 | | Manufacture of Fabricated Metal Products, except machinery & equipment |
| 381800 | 擦光、磨光和電鍍 | buffing, polishing & electroplating |
| 381998 | 其他金屬製品 | other fabricated metal products |
| 辦公室、會計和電腦機械製造業 | | Manufacture of Office, Accounting & Computing Machinery |
| 382000 | 辦公室、會計和電腦機械 | office, accounting & computing machinery |
| 收音機、電視、通訊裝備和儀器製造業 | | Manufacture of Radio, Television & Communication Equipment & Apparatus |
| 383000 | 收音機、電視、通訊裝備和儀器 | radio, television & communication equipment & apparatus |
| 電子元件和組成件製造業 | | Manufacture of Electronic Parts & Components |
| 384000 | 電子元件和組成件 | electronic parts & components |
| 電器和家庭用品、電子玩具製造、以及電機修理廠業 | | Manufacture of Electrical Appliances & Houseware, Electronic Toys, & Electrical Workshops |
| 385000 | 電器和家庭用品、電子玩具製造、以及電機修理廠 | electrical appliances & houseware, electronic toys, & electrical workshops |
| 未有於別處分類的機械、裝備、儀器、元件和組合件製造業 | | Manufacture of Machinery, Equipments, Apparatus, Parts & Components n.e.c. |
| 387998 | 未有於別處分類的機械、裝備、儀器、元件和組合件 | machinery, equipments, apparatus, parts & components n.e.c. |
| 工業：運輸裝備業 | | Industry: Transport Equipment |
| 388996 | 土地密集和大型的重工業；包括船廠、遊艇廠、鐵路裝備和飛機組合及維修、拆船、以及大型鋼管製造。 | land intensive and large scale heavy industries; inc shipyards, boatyards, railroad equipment & aircraft assembly & repair, and ship-breaking, manufacture of large steel tubes. |
| 388997 | 汽車、機車和腳踏車的製造、組合和維修。 | manufacture, assembly & repair of motor vehicles, motor cycles and bicycles. |
| 388998 | 未有於別處分類的交通裝備的製造和組合 | manufacture & assembly of transport equipment n.e.c. |
| 未有於別處分類的專業及科學、測量及操控裝備，以及攝影和光學產品業 | | Manufacture of Professional & Scientific, Measuring & Controlling Equipment n.e.c. & Photographic & Optical Goods |
| 389000 | 未有於別處分類的專業及科學、測量及操控裝備，以及攝影和光學產品。 | professional & scientific, measuring & controlling equipment n.e.c. & photographic & optical goods. |
| 未有於別處分類的製造工業 | | Manufacturing Industries n.e.c. |
| 390997 | 未有於別處分類的厭惡性工業 | offensive industries n.e.c. |
| 390999 | 鈕扣、線軸、傘、蚊帳、帆和旗幟 | buttons, bobbins, umbrellas, mosquito nets, sails & flags |
| 390500 | 假髮和髮製品 | wigs & hair products |
| 399998 | 未有於別處分類的製造工業 | manufacturing industries, n.e.c. |
| 設施、運輸、旅遊、通訊服務業 | | Utilities, Transport, Travel, Communication Services |
| 499998 | 設施、運輸、停車場、隧道、旅遊、通訊 | utilities, transport, car parks, tunnels, travel, communication |

| 商業種類編碼 Business Classification Code | | 說明 Description |
|---|---|---|
| 建築業 | | Construction |
| 599998 | 建築、裝修、維修和保養 | construction, decoration, repair & maintenance |
| 批發業 | | Wholesale |
| 610000 | 批發 | Wholesale |
| 零售業 | | Retail |
| 620000 | 任何種類的零售 | retail shop of any kind |
| 進口／輸出業 | | Import/Export |
| 630000 | 進口／輸出 | import/export |
| 餐館業 | | Restaurants |
| 641100 | 餐館業——中式 | restaurants—Chinese |
| 641200 | 餐館業——非中式 | restaurants—non-Chinese |
| 641300 | 餐館業——快餐店 | restaurants—fast food shops |
| 641998 | 餐館業——其他飲食場所 | restaurants—other eating places |
| 旅館和宿舍業 | | Hotels & Boarding Houses |
| 651100 | 旅館 | hotels |
| 651200 | 宿舍 | boarding houses |
| 船舶食水補給業 | | Shipping Water Supply |
| 719997 | 遠洋船舶補給 | ocean-going shipping supply |
| 719998 | 船舶補給，包括政府的售水站 | shipping water supply, incl government water selling kiosks |
| 倉庫業 | | Storage |
| 721000 | 倉庫，包括凍倉和貨櫃場 | storage, incl. cold storage and container storage yard |
| 商業辦公室業 | | Commercial Offices |
| 899998 | 商業辦公室 | commercial offices |
| 私家會所和機構業 | | Private Clubs & Institutions |
| 938887 | 私立教育和體育機構 | private academic & sports institution |
| 938888 | 私立福利活動 | private welfare activities |
| 938889 | 未有於別處分類的私立會所，機構和宗教組織 | private clubs, institution and religious organisations n.e.c. |
| 醫院和診所業 | | Hospitals & Clinics |
| 939998 | 醫院和診所 | Hospitals & clinics |
| 美容院業 | | Beauty Salons |
| 959198 | 理髮和美容店 | barber & beauty shops |
| 959499 | 浴室和按摩美容院 | bath houses & massage parlours |
| 洗衣、乾洗和成衣服務業 | | Laundry, Dry Cleaning & Garment Services |
| 952000 | 洗衣業務 | laundries |

| 商業種類編碼<br>Business Classification Code | | 説明<br>Description |
|---|---|---|
| 特許供水(私人) | | CONCESSIONARY SUPPLY (PRIVATE) |
| 030010 | 私人噴水池。 | Private fountains. |
| 030020 | 私人游泳池及泛舟池。 | Private swimming pools & boating ponds. |
| 030030 | 私人清洗及去塵用水。 | Cleansing & dust suppression for private use. |
| 030040 | 私人花園、草坪及網球場。 | Gardens, lawns and tennis courts for private use. |
| 030050 | 清洗私人車輛。 | Washing vehicles for private use. |
| 030060 | 私人空調設備。 | Air-conditioning for private use. |
| 其他服務業/空置單位 | | Miscellaneous Services/Vacant Premises |
| 999998 | 其他服務或空置單位。 | Miscellaneous services/vacant. |

| 住宅種類編碼<br>Domestic Classification Code | 說明<br>Description | |
|---|---|---|
| 住宅供水 | DOMESTIC SUPPLY | |
| 010010 | 個人居住面積為35平方呎或以上且設有獨立水錶及廁所設備的屋邨。 | Housing estates with occupancy rate 35 or more square feet per person & with individual metered supply and toilet facility. |
| 010020 | 個人居住面積少於35平方呎且無獨立水錶及廁所設備的屋邨。 | Housing estates with occupancy rate less than 35 square feet per person with or without individual metered supply and toilet facility. |
| 010030 | 地下及低層供商業或輕工業用途的多層建築物內樓面總面積少於1 000平方呎的單位，包括居者有其屋計劃及私人機構參與計劃的屋邨。人口密度約為每公頃1 740人，而最高建造比率則為8.0。 | Flats of gross floor area less than 1 000 square feet in a multi-storey building, the ground or lower floors of which are for commercial or light industrial uses, including housing estates of Home Ownership Scheme and Private Sector Participation Scheme. Population density about 1 740 persons per hectare and with a maximum plot ratio of 8.0. |
| 010040 | 主要作為住宅用途而地下及低層通常並無舖位、寫字樓或從事工業場所的多層建築物內樓面總面積約為1000或以上平方呎的單位，人口密度約為每公頃1 050人。而最高建造比率則為5.0。 | Flats of gross floor area in the region of 1 000 square feet or more in a multi-storey building which is used mainly for residential purpose and normally without shops, offices or industries at the ground or lower floor level. Population density about 1 050 persons per hectare with a maximum plot ratio of 5.0. |
| 010050 | 市區內連花園的大型豪宅或獨立式屋宇，人口密度約為每公頃470人，而最高建造比率則為3.0。 | Luxurious, large flats or detached houses with gardens in urban area. Population density about 470 persons per hectare with a maximum plot ratio of 3.0. |
| 010060 | 新界或離島區不多於兩層的豪華獨立式屋宇或別墅，最高建造比率為0.4。 | Luxurious detached houses or villas of not more than 2 storeys in the New Territories or Outlying Islands. Maximum plot ratio 0.4. |
| 010070 | 木屋或臨時房屋區或由政府編配的安置區內的屋宇。 | Houses in slum area or Government allocated . Licensed Area. |
| 010080 | 新界（包括離島區在內）村民的丁屋。 | Small houses of villagers in the New Territories including Outlying Islands. |
| 010090 | 軍部或其他駐港人民解放軍的住宅單位、以及供住宅用途的屋宇或建築物。 | All domestic flats, houses or building for domestic uses of Military and other People's Liberation Army. |
| 沖廁用淡水（私人及政府） | MAINS WATER FOR FLUSHING (PRIVATE & GOVERNMENT) | |
| 021010 | 沖廁用淡水（不可改為鹹水）。 | Mains water flushing non-convertible to salt water. |
| 022010 | 沖廁用淡水（可改為鹹水）。 | Mains water flushing convertible to salt water. |

| 政府種類編碼<br>Government Classification Code | 說明<br>Description | |
|---|---|---|
| 免費供水（政府） | FREE SUPPLIES (GOVERNMENT) | |
| 041010 | 公立診療所、配藥處、留產所、火葬場、殮房及墳場。 | Government clinics, dispensaries, maternity homes, crematoriums, mortuaries & cemeteries. |
| 041020 | 焚化爐、養狗場、石礦場、廠房、倉庫、抽水站、濾水池及濾水廠、化驗所及工場。 | Incinerators, kennels, quarries, depots, stores, pumping stations, filters & treatment works, laboratories & workshops |
| 041030 | 大會堂、遊樂場、公園、球場／體育館、海灘、圖書館、福利中心等。 | City Halls, playgrounds, parks, stadiums, beach, libraries, welfare centres, etc. |
| 041040 | 警署、警崗及車廠、消防局及車廠、監獄、法院及裁判司署、政府辦事處、郵政局、印刷所、停車場、碼頭及官立學校。 | Police stations, posts & depots, fire-stations & depots, prisons, courts & magistracies, Government offices post-offices, printers, car-parks & wharfs & Government schools. |
| 041050 | 公共廁所、浴室、街市及市場。 | Latrine, bath houses, markets & bazaars. |
| 041060 | 街喉。 | Standpipes. |
| 041070 | 所有獲免費供水的政府宿舍及營房（即該等宿舍及營房的住客免繳水費）。 | All Government quarters or barracks with free supply i.e. no charge is made to the occupants of such quarters or barracks. |
| 041080 | 其他並未另行列明的政府免費供水，但食水售賣站及臨時用淡水沖廁除外。 | Other Government free supplies not separately itemized, but excluding water-selling kiosks & temporary mains flushing. |
| 042010 | 政府特許供水——噴水池。 | Government concessionary supply—fountains. |
| 042020 | 政府特許供水——游泳池及泛舟池。 | Government concessionary supply—swimming pools & boating ponds. |
| 042030 | 政府特許供水——清洗及去塵。 | Government concessionary supply—cleansing & dust suppression. |
| 042040 | 政府特許供水——花園、草坪及網球場。 | Government concessionary supply—gardens, lawns & tennis courts. |
| 042050 | 政府特許供水——洗車。 | Government concessionary supply—washing vehicles. |
| 042060 | 政府特許供水——空調用途。 | Government concessionary supply—air-conditioning. |

**Annex 5**
**(para. 2.13)**

## Level 1 Fault Checking by CCBS

CCBS conducts this procedure using the same gradation of projected "average daily consumption" (ADC) levels and corresponding "high factors" adopted for meter reading by the PDA (see **Annex 1**).

For this procedure, however, an ADC is simply multiplied by its corresponding high factor to yield an acceptable consumption ceiling (in terms of average daily consumption) for checking the next reading.

During the fault checking, CCBS compares each new meter input against its consumption ceiling, and screens out those overshooting the latter. Such cases are referred to the Customer Account Section for follow-up by taking special readings.